Universal Pre-K: Research and Benchmarks

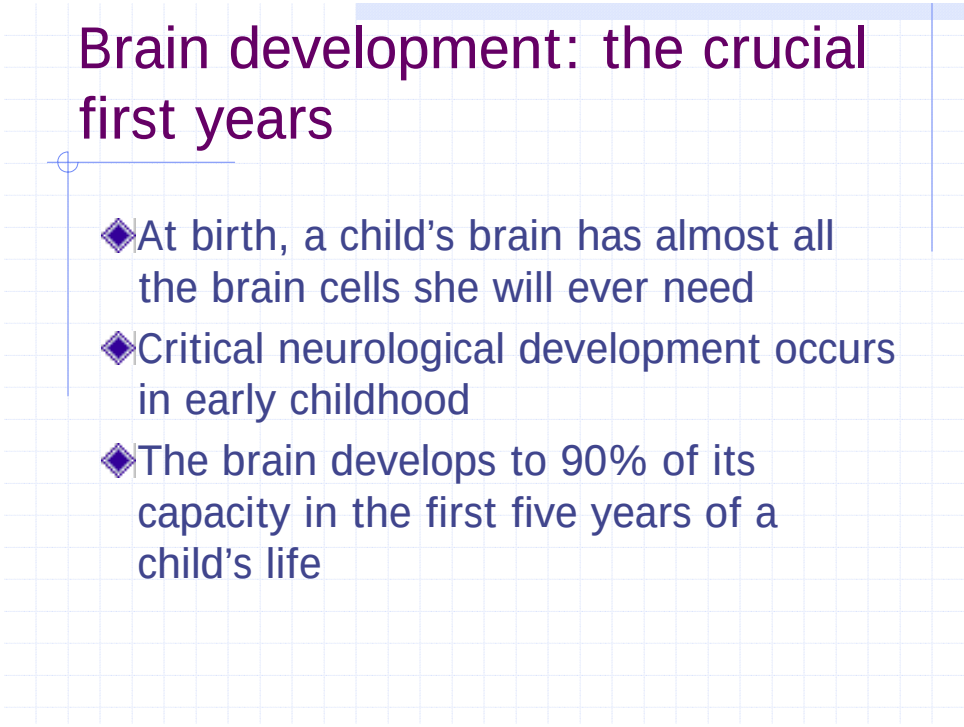
August 22, 2003

(#9—8/22/03)

Brain Development: The Crucial First Years

The first years of life are critical in children's brain development, and this development is very susceptible to adverse influences.

In the past few decades, science has made major advances in understanding child development, including what factors influence the child's development. These findings provide dramatic new information on the child's brain and its growth, but more importantly have demonstrated that the quality of the child's relationships and the degree of cognitive stimulation have a profound impact on the child's cognitive, emotional, and social growth.



The brain develops to 90% of its capacity in the first five years of a child's life. At birth, a child's brain has almost all the brain cells she will ever need. Links between an infant's 100 billion neurons must be hardwired through stimulation and interactions, because the brain will produce few more links after infancy. These crucial links provide the needed power for vision, hearing, language, emotions and movement.[1]

Recent brain research has altered assumptions. Now it is known that:

• Experience is critical, beginning before birth. The brain's circuitry is made up of brain cells – neurons – and the connections – synapses – they make with other brain cells. Synapses link to form neural pathways. When a child interacts with the environment – reacting to stimuli, processing information, storing it – new signals activate or create neural pathways. These pathways are critical to healthy development and learning. And the vast majority of synapses are produced during the first three years of life.[2]

- Synapses activated many times by repeated early experience tend to become permanent.

- Synapses not used often enough tend to be eliminated.

These findings, combined with other advances in research, have led to a new and fuller understanding of child development and what influences development during the early years. These findings include:

- Children are born ready to learn. From birth to kindergarten, they are on a fast track making significant linguistic and cognitive gains and rapid progress in emotional, social, and regulatory capacities.

- Children are very vulnerable to harm during these early years.

- Beginning even before birth, the brain is greatly influenced by environmental conditions, including the kind of nourishment, care, surroundings, and stimulation they receive.

- Relationships matter a great deal. Parents and other regular caregivers are critical elements in a child's environment. How they protect, nurture, and stimulate a child influences early development for better or worse.

- Early care can have a lasting impact on how children develop, learn, and behave.

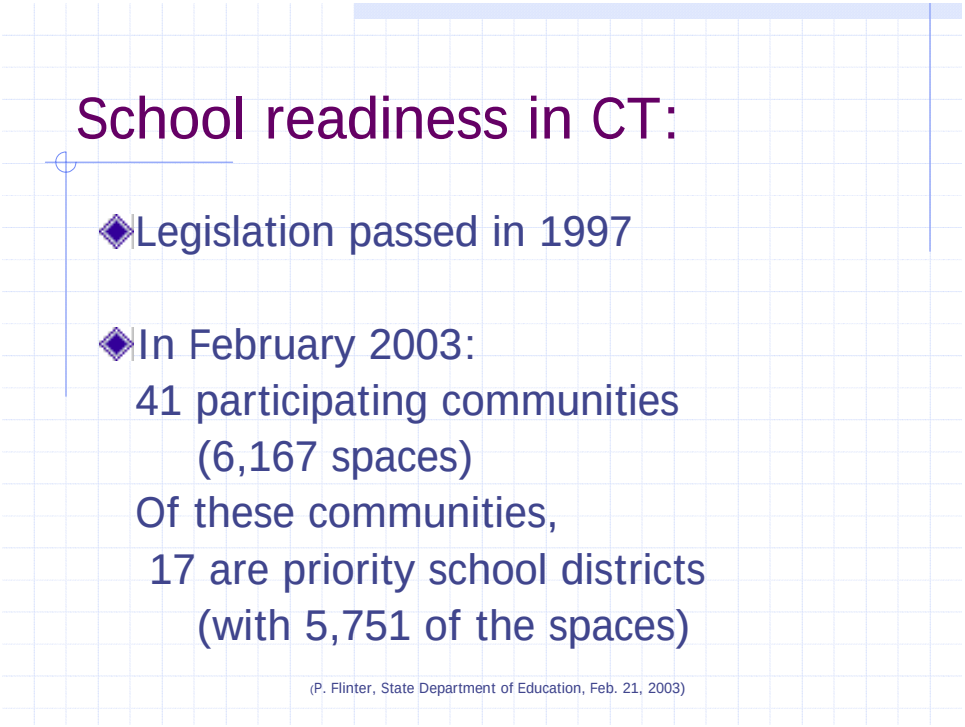
A Carnegie Corporation study noted that "the quality of young children's environment and social experience has a decisive, long-lasting impact on their well-being and ability to learn."[3]

School Readiness in CT

School readiness programs began in Connecticut under a series of laws enacted in the mid-to late-1990s. The goal of the program, as expressed in a 1997 report by the School Readiness Council, established by statute (P.A. 95-226, P.A. 96-213) and convened by the Commissioners of Education and Social Services, is to "ensure that all of our children enter school ready and eager to learn." The Council identified several key elements of quality programs: that they provide or are linked to programs providing early childhood education, health care, social services, parental involvement and other key components, provide a program of support, training and professional development, be child centered and family focused, and involved broad-based community partnerships with schools, child care programs, family resource centers, employer sponsored programs and local government. [4]

The School Readiness Council recommended that "within five years[, e]very Connecticut child between three and five years of age will have access to quality preschool education that meets child and family needs."[5]

Although the school readiness program has not yet reached that universal goal, it has resulted in a significant number of preschoolers having the opportunity to benefit from a school readiness program. As of February 2003, there were 41 participating school readiness communities with 6,167 spaces. Of these communities, 17 were priority school districts with 5,751 of the spaces.[6]



State Mastery Test Scores – 2002

The need for universal school readiness programs to help prepare all children for school success can be seen clearly in the continued racial and income divide in Connecticut students' performance on standardized educational tests.

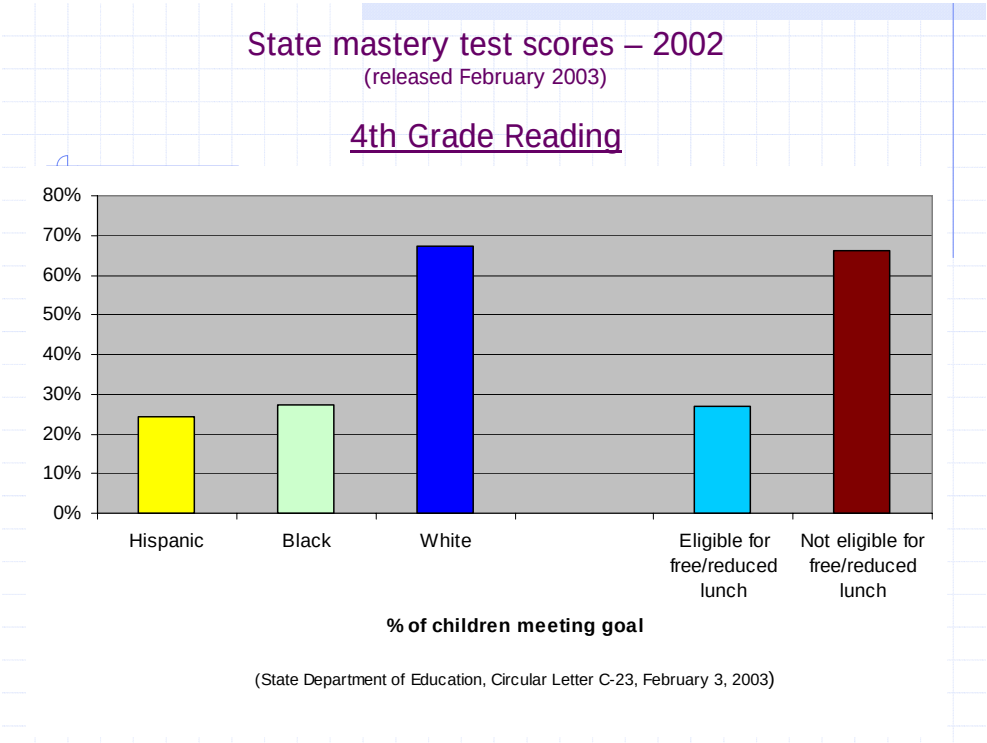
The 2002 results of the National Assessment of Educational Progress, also known as the Nation's Report Card, showed that Connecticut schoolchildren's writing scores ranked first in the nation – at both the 4th grade and 8th grade levels.[7] Forty-nine percent of the state's 4th graders scored at the proficient or advanced levels, nearly twice the national rate of 27 percent.[8]

However, Connecticut's minority 4th graders trailed the state's White students (average writing score of 182) by significant margins – Black students trailed by 33 points and Hispanic students by 28 points.[9] In the percentage of 4th graders who scored at the proficient or advanced levels, Connecticut's Black and Hispanic fourth-graders outscored those in nearly all other states, but they trailed Connecticut's White students by large margins – 36 percentage points between Whites and Blacks; 32 percentage points between Whites and Hispanics. [10]

On the 2002 Connecticut Mastery Test, in reading, math and writing, minority and lower-income students (those eligible for free or reduced lunch) performed at lower levels than non-minority and higher-income students.[11]

State Mastery Test: 4th Grade Reading

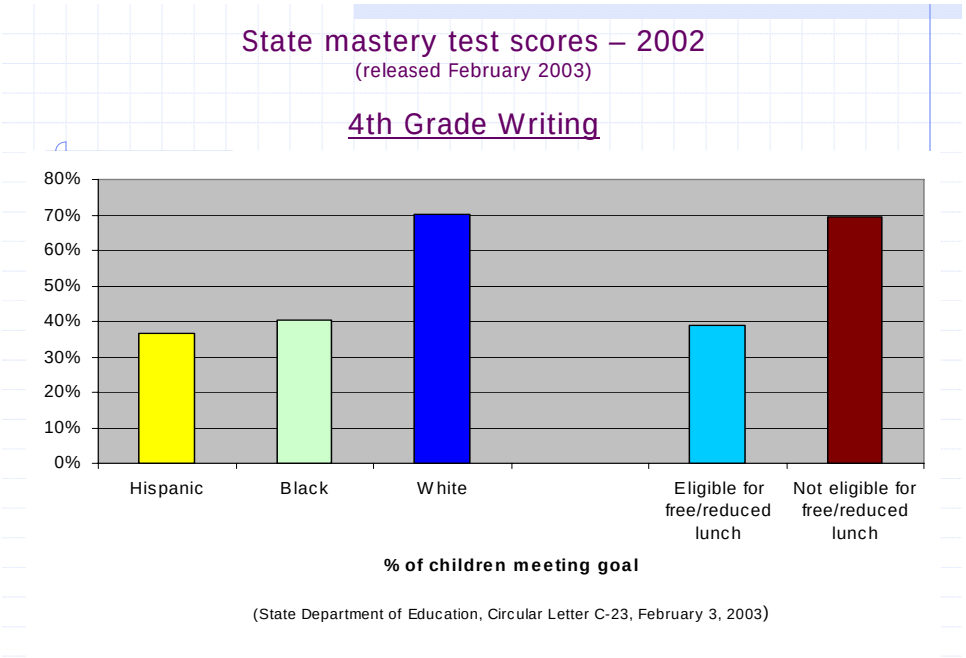
In 4th grade reading, 67% of White students met the goal, compared to 27% of Black students and 24% of Hispanic students.



(State Department of Education, Circular Letter C-23, February 3, 2003)

State Mastery Test: 4th Grade Writing

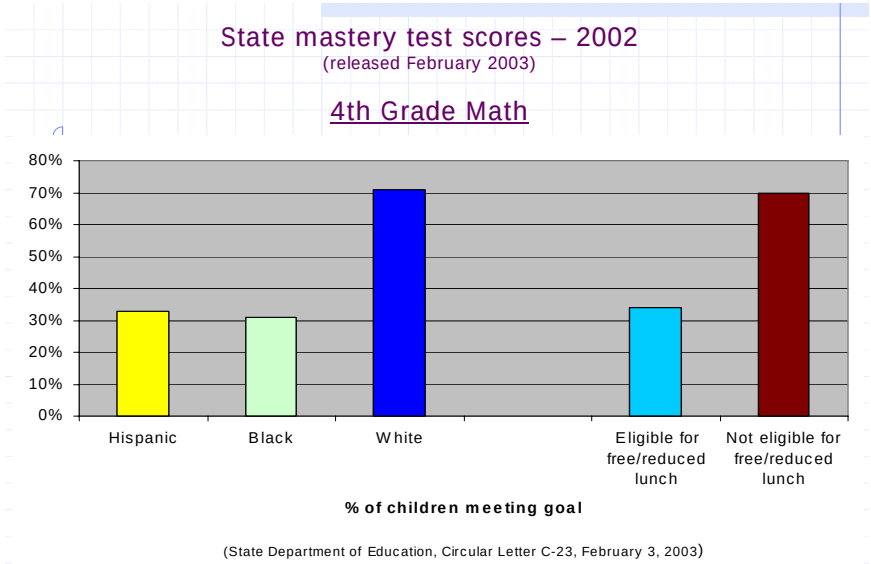
In 4th grade writing, 70% of White students met the goal, compared with 40% of Black students and 37% of Hispanic students.



(State Department of Education, Circular Letter C-23, February 3, 2003)

State Mastery Test: 4th Grade Math

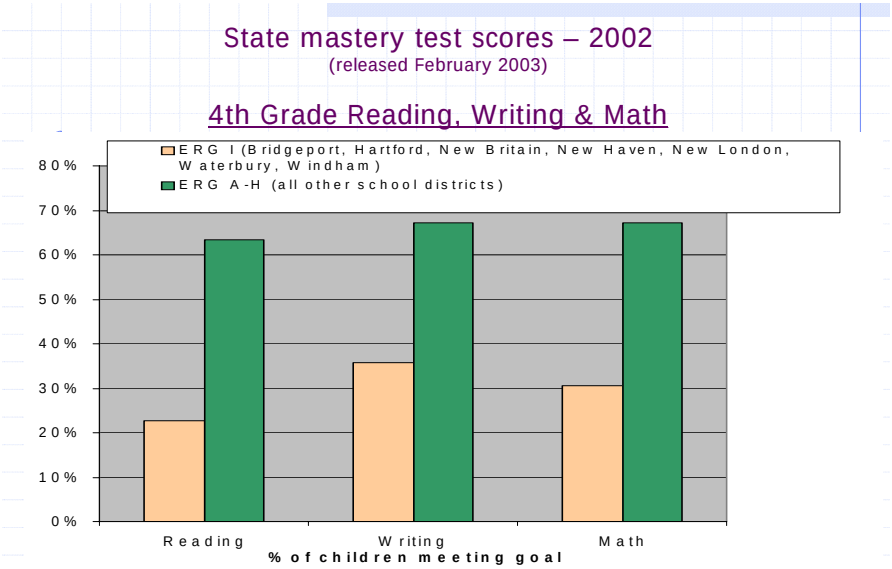
In 4th grade math, 71% of White students met the goal, compared with 31% of Black students and 33% of Hispanic students.



(State Department of Education, Circular Letter C-23, February 3, 2003)

State Mastery Test: 4th Grade Reading, Writing & Math

Fourth grade students in ERG I performed much more poorly than those students in the other ERGs on the 2002 mastery tests.



(State Department of Education, Circular Letter C-23, February 3, 2003)

School Readiness Research in Connecticut

Current research in Connecticut unerringly supports an investment in quality preschool:

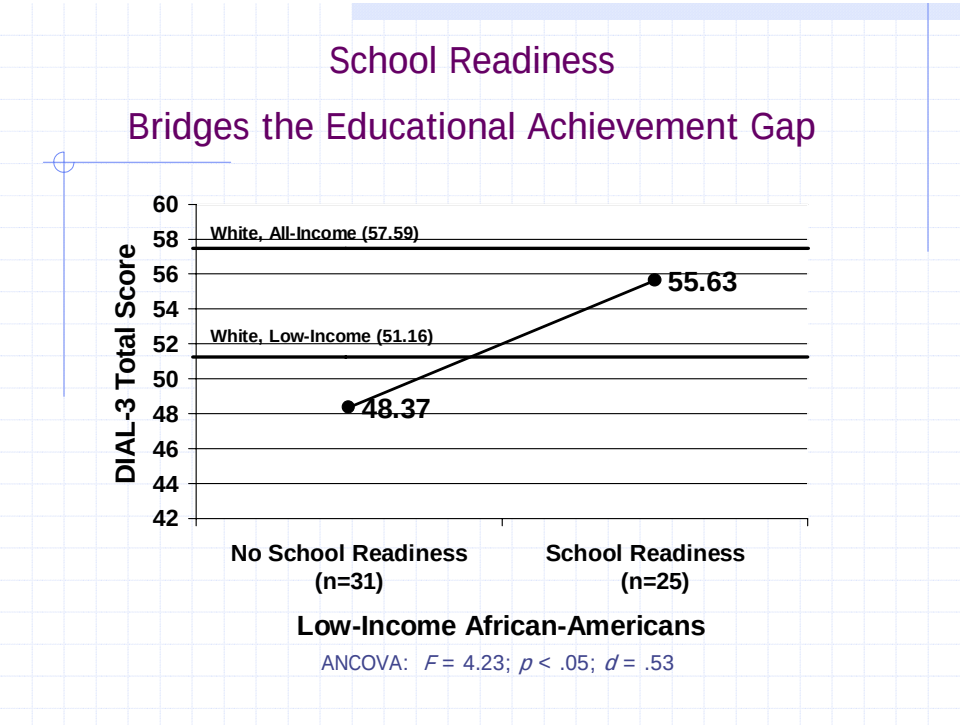
Middletown School Readiness:

The availability of a school readiness program accounted for a significant increase in the number of low-income African-American children "ready" for school – from 87.1 percent (of those who did not attend) to 96.0 percent (of those who did attend). Among white children in general, 96.97 percent were prepared for school.[12]

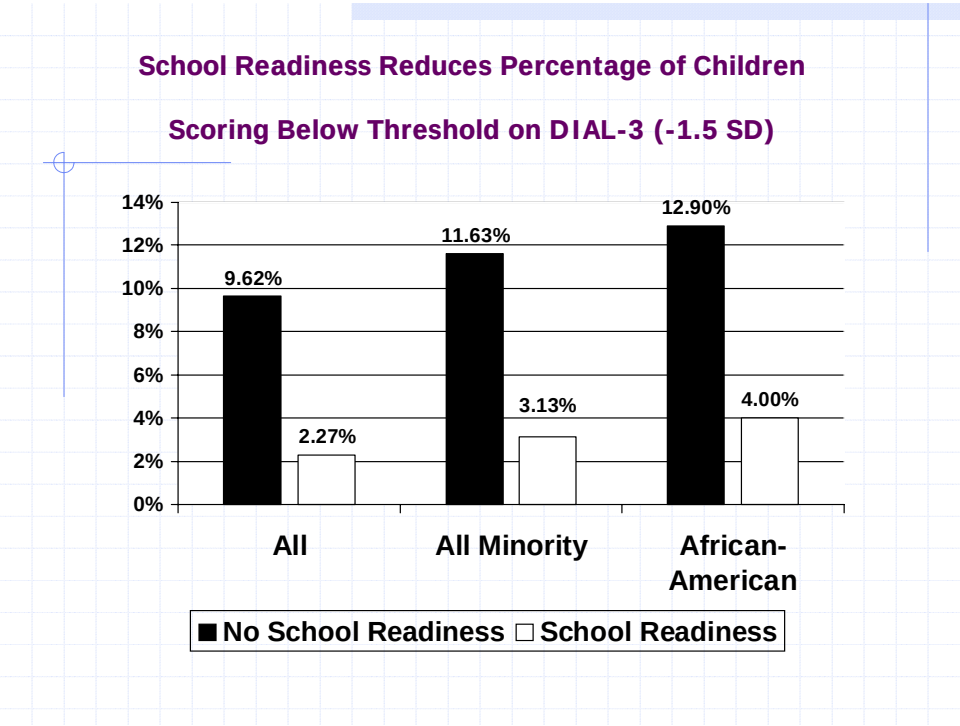
Low-income African American children who attended a school readiness program attained an average school readiness score (55.63) that was comparable to white children in general (57.59) and surpassed both white low-income children (51.16) and those low-income African American children who did not attend a school readiness program (48.37).

These findings provide strong evidence that school readiness programs can help to close the educational gap at kindergarten entry between white and low-income African American children. The study, conducted in Middletown, Connecticut, used the results of the DIAL-3 developmental screening test to find those at-risk of school difficulties in kindergarten.

Among Middletown children enrolled in kindergarten, 46 percent of African Americans and 50 percent of Latino children participated in a school readiness program, as opposed to 31 percent of white children. The study also found that children – across racial and economic lines – who attended two years of pre-K, were significantly better prepared for kindergarten than those who attended only one year.



The Middletown findings, conducted by Walter Gilliam of Yale University, are consistent with an earlier analysis of all state-funded school readiness programs. That study, conducted by Edward Zigler and Walter Gilliam, found that pre-K programs had a significant impact in increased competence, reduction in behavior problems by 4th grade, improved attendance and grades in elementary school, and improved state achievement scores. In addition, every state that looked at the impact of their program on grade retention found a significant impact.

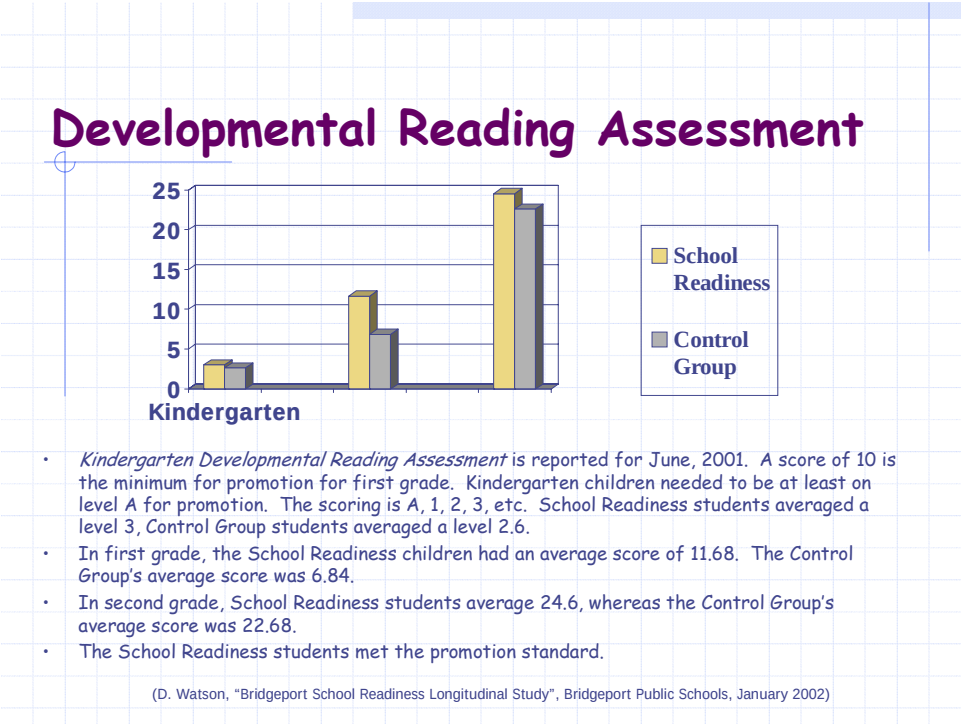


Bridgeport School Readiness:

Similarly, Bridgeport followed children who had quality early care and education programming and those who did not have such programming. Children who had quality early education had fewer retentions, more frequent attendance, and higher reading scores throughout grades K-2.[13]

Those children in the Bridgeport study who had quality early care and education had stronger reading scores than the other children. First-graders who had quality early care and education averaged a score of 11.68 on the Developmental Reading Assessment (DRA), and all of those students exceeded the "substantially deficient" level o f 10. In contrast, those children who did not have quality early care and education averaged just 6.84 on the DRA.

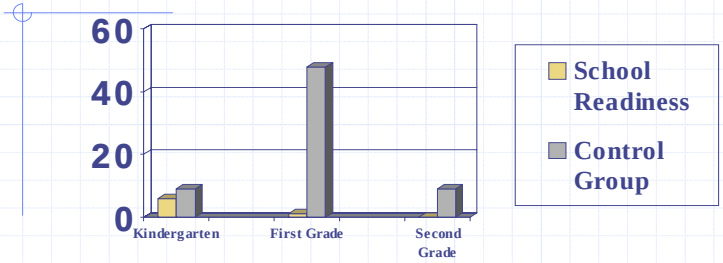
The average number of days absent for the Readiness group was significantly lower in both kindergarten and first grade than the control group. Kindergarten students who had preschool had an average of 9.76 days absent, compared with 15.65 days for those who did not attend preschool.



Attending a school readiness program greatly reduced the likelihood that a child would be retained in grades K-2.

In the first grade, 47 percent of students (45 out of 96 students) who did not have quality early care and education were retained, compared with only 1 percent of students (1 out of 88 students) who had quality early care and education.

Retentions - Percentages



- In Kindergarten, 11/197 School Readiness children were retained (as compared to 15/176.
- In First Grade, 1/88 School Readiness children were retained (as compared to 49/96) [note: the 49/96 rate represents 45 children retained and four multiple retentions].
- In Second Grade, 0/13 School Readiness children were retained where as 2/23 Control Group students were retained.

(D. Watson, "Bridgeport School Readiness Longitudinal Study", Bridgeport Public Schools, January 2002)

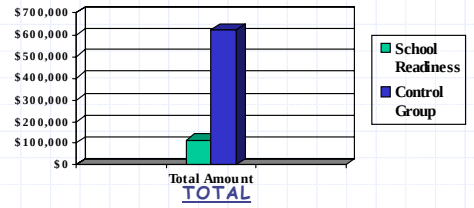
School readiness saved significant tax dollars in decreased retention. Retentions in K-2 cost $622,644 for the control group and $113,208 for the school readiness children who were observed. School readiness dramatically decreased retention.

The per pupil cost for educating a child in Bridgeport is $9,434. Costs added to the Bridgeport Public Schools' budget due to retentions for just Grades K and 1:

Kindergarten Retentions		
School Readiness -- 11		$103,774
Control Group -- 15		$141,510

First Grade Retentions		
School Readiness -- 1		$ 9,434
Control Group -- 49		$462,226

Second Grade Retentions		
School Readiness -- 0		$ 0
Control Group -- 2		$ 18,868



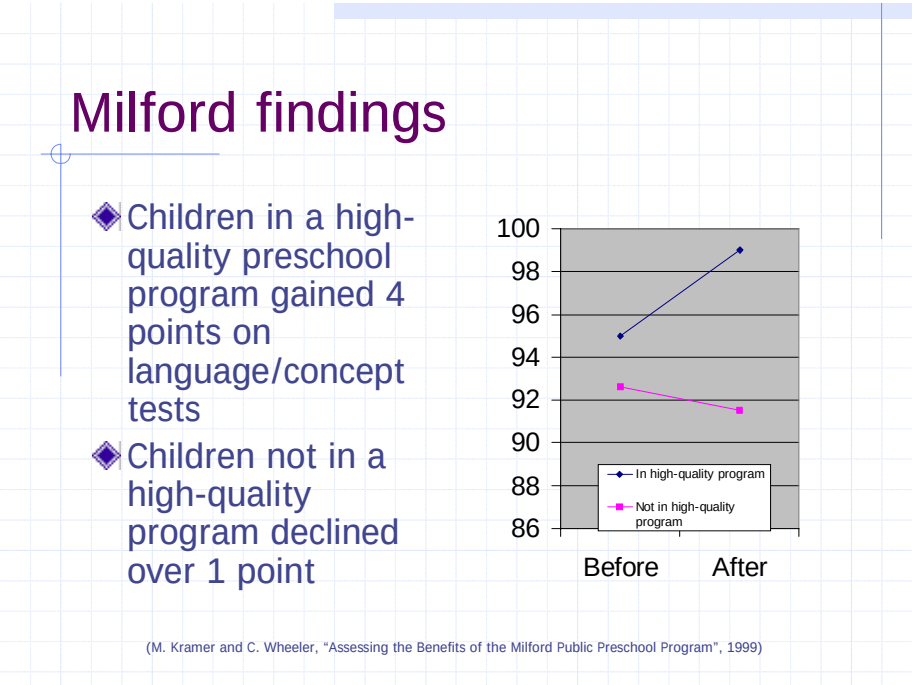
School Readiness = $113,208 VERSUS Control Group = $622,644

(D. Watson, "Bridgeport School Readiness Longitudinal Study", Bridgeport Public Schools, January 2002)

Milford School Readiness:

Milford, Connecticut found that children who attended a high-quality preschool program were significantly more school ready upon entry to kindergarten and more successful in school than children who did not attend the high-quality program.[14] Children in the longitudinal study were from primarily white, middle-income backgrounds and had been previously identified as being at high risk for educational failure or having special education need.

Children in the high-quality preschool program gained an average of four points (95.0 to 99.0) on age appropriate tests in language, motor skills and concept development over the course of the preschool program. In contrast, children who did not at tend a high-quality program (half of whom were in center-based care) lost developmental ground, experiencing a decline in average test scores (92.6 to 91.5) over the same period.



The Milford study found that:

- Two thirds of the students who completed the preschool program required no special services when they were in kindergarten, grade one or two.
- Preschool participants were three times less likely to require special education during their kindergarten year.
- Children who did not attend the high quality preschool program were over four times more likely to be retained at the end of their kindergarten year. This is compelling as some argue that the gains in early care and education do not hold for middle class children. This showed that they did.
- Preschool programs saved Milford approximately $3 million over five years in reduced expenditures on outside special education tuition and transportation.

Economically Integrated Programs and Language Growth

Children may benefit especially from school readiness programs that mix children from diverse economic backgrounds. A recent Connecticut study found that low-income children attending preschool with more affluent peers increased their vocabulary skills six times faster than children in classes made up entirely of low-income children.[15]

After six months, the vocabulary gains made by the low-income students in mixed-income classrooms were significantly greater than those of other low-income children.

Economically Integrated Programs & Language Growth

- After six months, the vocabulary gains made by the low-income students in mixed-income classrooms were significantly greater than those of other low-income children:

	Low-income children in homogeneous classrooms	**Low-income children in heterogeneous classrooms**	Mid/upper-income peers in heterogeneous classrooms
Mean Standard Score	90.9	93.6	113.7
Mean Monthly Standard Score Gain	**.21**	**1.58**	.46
Mean Standard Score After Approx. 6 Months (assessment dates varied)	92.0	102.9	116.8

C. Schechter, "Language Growth in Low-income Children in Economically Integrated Versus Segregated Preschool Programs" (forthcoming)

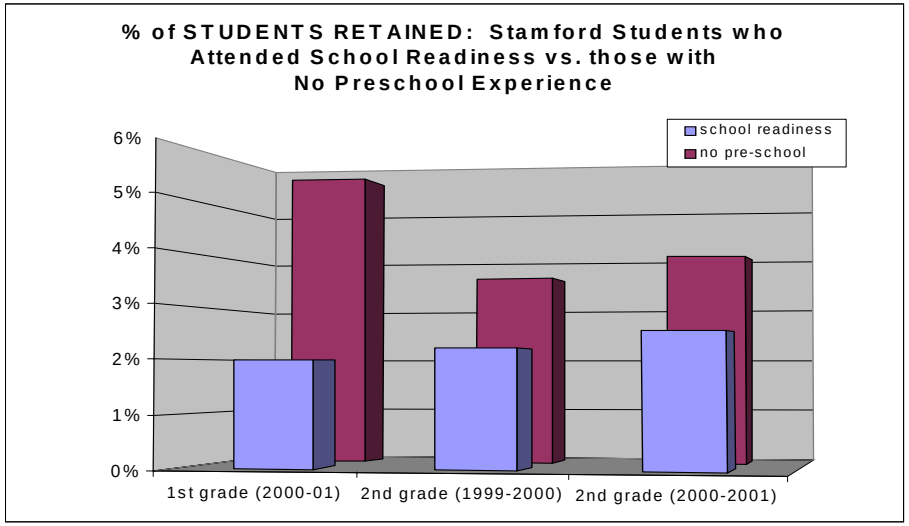
Stamford School Readiness Shows Gains

New results from a Stamford study show that school readiness leads to many gains once children from such programs reach school.[16] Children from Stamford school readiness programs, compared to children with no preschool background, had:

- higher reading achievement (in kindergarten, 1st and 2nd grades)
- higher report card marks in many areas (in kindergarten, 1st and 2nd grades)
- fewer retentions
- higher attendance rates (in kindergarten, 1st and 2nd grades)
- fewer ESL and Bilingual placements

In the Stamford study, school readiness students were retained much less often than students with no preschool experience.

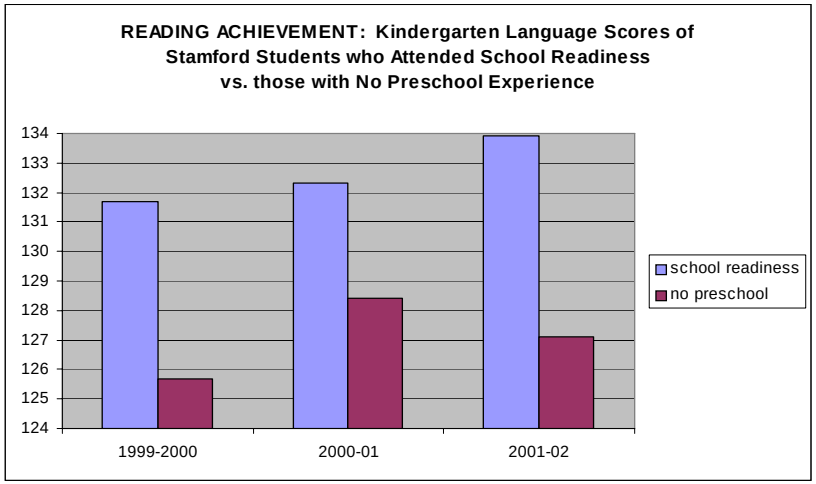
Stamford school readiness



(J. Singer, "The Stamford School Readiness Program: A Longitudinal Study," Stamford Public Schools, October 2002)

In three consecutive years, Stamford school readiness students scored higher than non-preschool students on kindergarten language assessments – and the average sc ores of the school readiness students in kindergarten rose from 1999-2000 to 2000-01 and again in 2001-02.

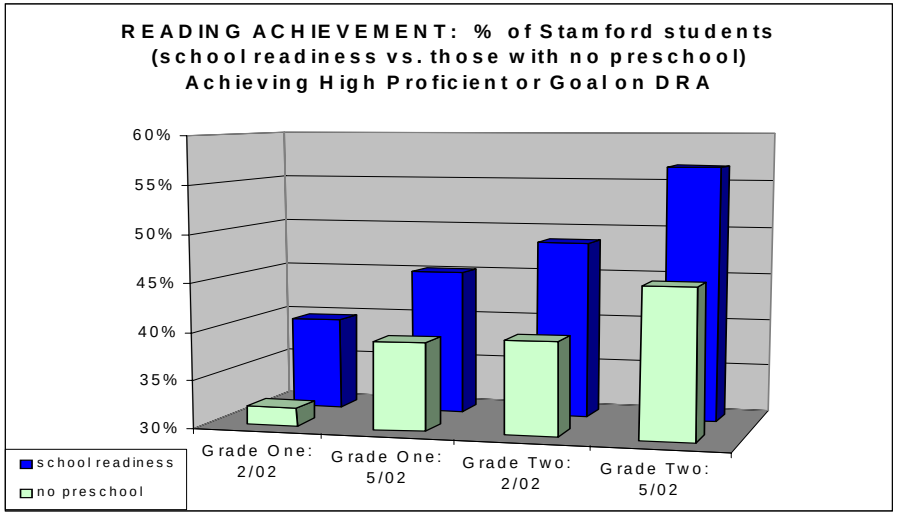
Stamford school readiness



(J. Singer, "The Stamford School Readiness Program: A Longitudinal Study," Stamford Public Schools, October 2002)

The Stamford school readiness students in 1s t and 2nd grades to non-preschool students scored higher the DRA assessment in four different comparisons in 2002.

Stamford school readiness

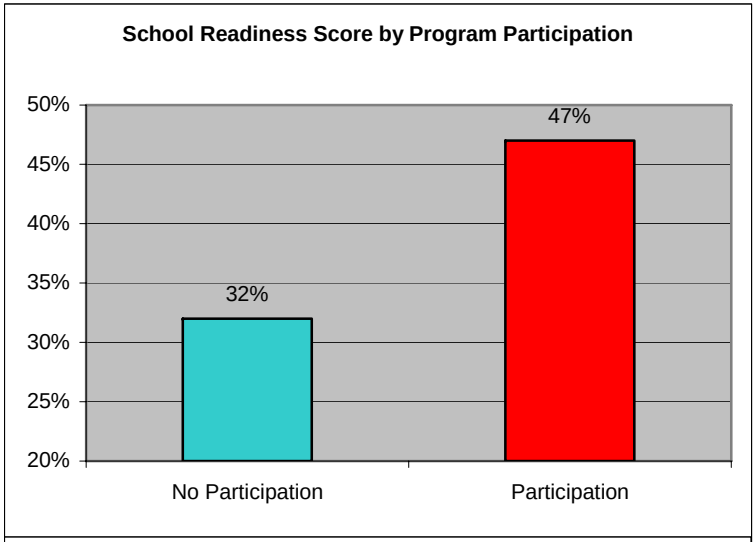


(J. Singer, "The Stamford School Readiness Program: A Longitudinal Study," Stamford Public Schools, October 2002)

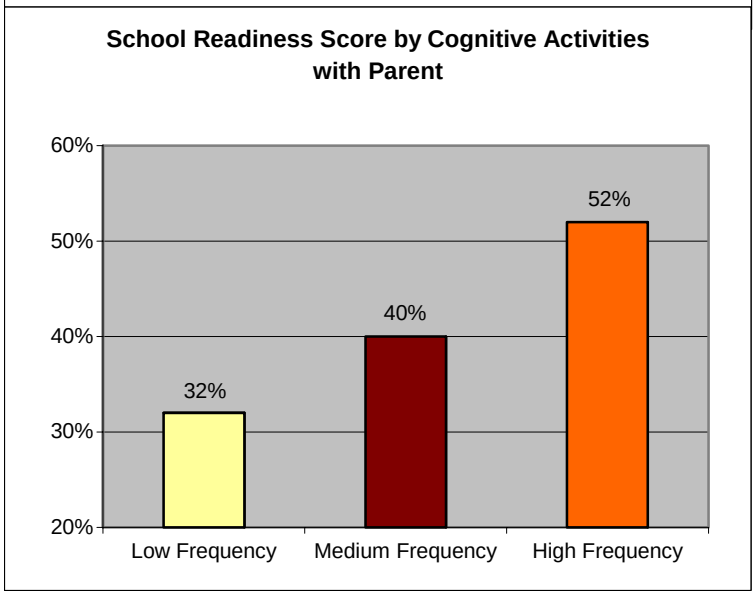
Hartford School Readiness

The first study of the school readiness of Hartford's children found that children who have sustained parental involvement and who participate in organized early childhood experiences score above the national norm and enter school ready to learn.[17] The purposes of the study were to examine children's readiness and to identify what influences that readiness. The study measured school readiness by using Early Screening Profiles, which are nationally normed assessments based upon data obtained from children and their parents. Forty percent (40%) of all Hartford children surveyed scored above the national norm on school readiness.

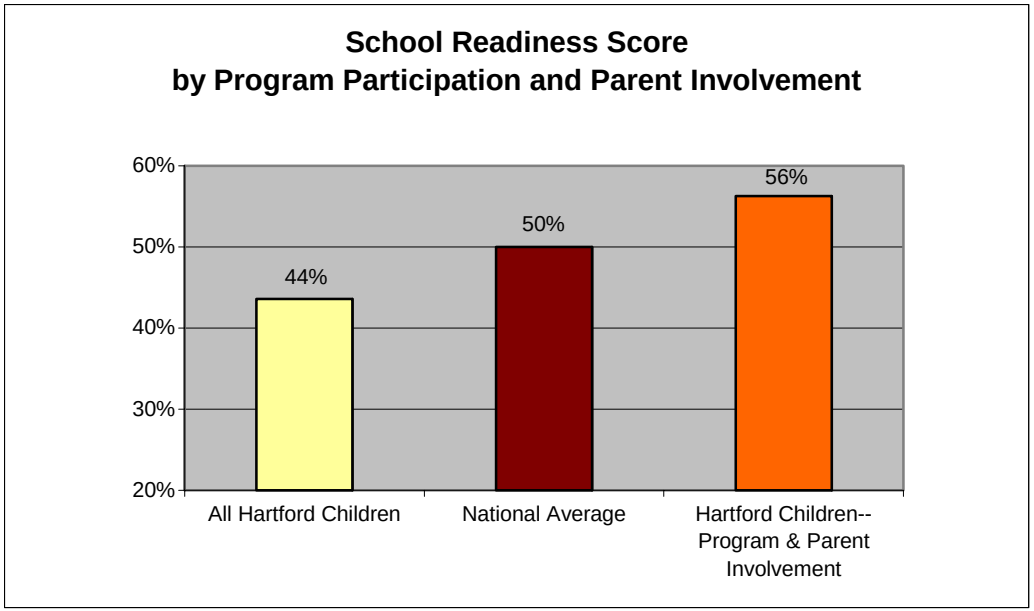
Hartford children who participated in organized early childhood programs and experiences scored significantly higher on school readiness skills than children who did not participate.



Hartford children whose parents spent more time with them reading books, practicing numbers or letters, or engaging in other cognitive activities scored higher than other children.



Hartford children who participated in organized early childhood programs *and* whose parents were highly involved with them in stimulating activities scored highest, significantly above the national norm.



Endnotes

[1] The Governor's Task Force on Early Childhood Care and Education (September 2002). "Early Care and Education: The Keystone of Pennsylvania's Future: Report." Commonwealth of Pennsylvania, p. 13.
[2] Shore, R. (1997). Rethinking the brain: New insights into early development. New York: Families and Work Institute.
[3] Carnegie Corporation of New York (1994). *Starting Points: Meeting the Needs of Our Youngest Children.* New York, NY: Carnegie Corporation. Executive Summary.
[4] School Readiness Council (January 1, 1997). "School Readiness in Connecticut: A Report to the Governor and General Assembly by The School Readiness Council". Department of Social Services.
[5] School Readiness Council (January 1, 1997). "School Readiness in Connecticut: A Report to the Governor and General Assembly by The School Readiness Council". Department of Social Services.
[6] P. Flinter, State Department of Education, Feb. 21, 2003.
[7] U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. (2003). *The Nation's Report Card: Writing 2002* (pp. 23-24). NCES 2003-529, by H.R. Persky, M.C. Daane, and Y. Jin. Washington, DC: Author.
[8] U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. (2003). *The Nation's Report Card: Writing 2002* (p. 34). NCES 2003-529, by H.R. Persky, M.C. Daane, and Y. Jin. Washington, DC: Author.
[9] U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. (2003). *The Nation's Report Card: Writing 2002* (p. 69). NCES 2003-529, by H.R. Persky, M.C. Daane, and Y. Jin. Washington, DC: Author.
[10] U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. (2003). *The Nation's Report Card: Writing 2002* (p. 72). NCES 2003-529, by H.R. Persky, M.C. Daane, and Y. Jin. Washington, DC: Author. In the percentages of Black and Hispanic students that scored at or above proficient in writing, only Hispanic students in Florida (30 percent) scored higher than Connecticut Hispanic students (26 percent). Connecticut's Black students (22 percent) outpaced those in all other states.
[11] State Department of Education, Circular Letter C-23, February 3, 2003.
[12] Gilliam, W.S. & C. Fahey. "Middletown School Readiness: Bridging the Educational Gap." Results presented to Education Committee, Connecticut General Assembly. February 28, 2002.
[13] D. Watson, "Bridgeport School Readiness Longitudinal Study", Bridgeport Public Schools, January 2002.
[14] M. Kramer & C. Wheeler. (1999). "Assessing the Benefits of the Milford Public Preschool Program".
[15] C. Schechter, *Language Growth in Low-income Children in Economically Integrated Versus Segregated Preschool Programs"* (forthcoming).
[16] J. Singer, *The Stamford School Readiness Program: A Longitudinal Study*, Stamford Public Schools, October 2002.
[17] Hartford Public Schools, City of Hartford, Hartford Foundation for Public Giving & Philliber Research Associates. (Fall 2002). "Preparing Hartford's Children for School".